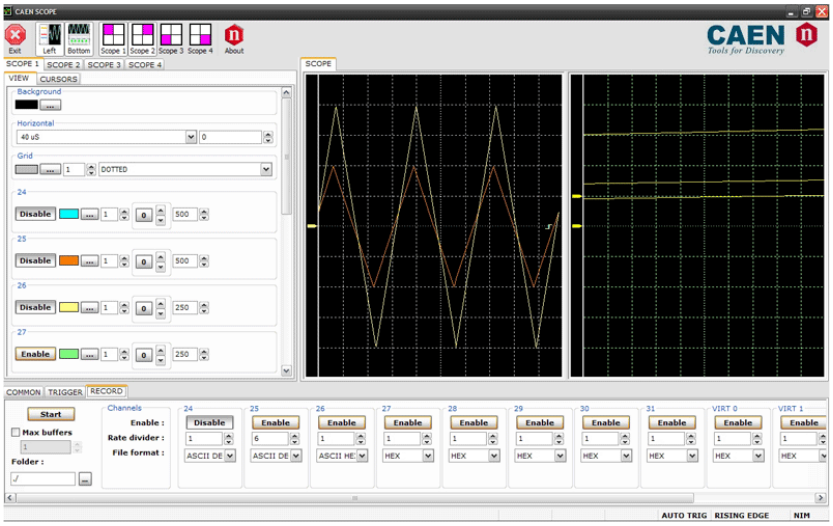
CAEN
Tools for Discovery

Electronic Instrumentation



GD2484

CAENScope QuickStart Guide

Rev. 3 - 30 September 2011

Purpose of this Guide

This QuickStart Guide contains the basic information and commands that will let you use CAENScope in few steps.

Change Document Record

Date	Revision	Changes
18 October 2010	00	Initial release.
16 December 2010	01	Revised all chapters
12 April 2011	02	Revised all chapters, new document format
30 September 2011	03	Section 1

Symbols, abbreviated terms and notation

DPP	Digital Pulse Processing
GUI	Graphical User Interface

Reference Documents

[RD1] V1720 & VX1720 User Manual

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1 Introduction

This CAENScope Quick Start Guide contains the basic information and commands that will let you use *CAENScope* in few steps.

CAENScope is a C based application that can control any model of CAEN digitizer (with the exception of x742 family). It allows the monitor and the acquisition of the digitized signal with a user friendly graphical interface.

To avoid any misunderstanding, we remind you that *CAENScope* is a graphical tool developed only for CAEN digitizers running standard firmware; if your digitizer runs some DPP firmware, e.g *DPP TF* or *DPP CI*, you have to use the relevant *DPPRunner*, a control software that you may download from CAEN website.

System requirements & installation setup

OS	OS version	CAEN Library required	Third-party software required
Windows	2000/XP/Vista/7	CAENVMELib	n/a
Linux	kernel Rel. 2.4/2.6	CAENVMELib	n/a

Tab. 1.1: host PC requirements

First of all be sure to have all the third-party software listed in the Tab. 1.1 installed, then:

- go to *CAENScope* web page.
- Download the CAENScope **FULL INSTALLATION** package related to your OS.
- unzip the downloaded package

Note: the **FULL INSTALLATION package** contains the CAENScope tool and the required CAEN Libraries (last release).

- Install the required libraries (contained in the folder “required”)
- launch the CAENScope Setup executable file and follow the installer instructions
- For Linux users, follow the instructions in the Install file.

2 Board Connection

CAEN digitizers can be connected to the host PC through the three following ways.

Direct Link to the Module via USB

Desktop and NIM versions can be directly handled via USB as well, just connecting the digitizer to the host PC via the USB cable (the USB driver is available on Digitizer web page)

Direct Link to the Module via Optical Link

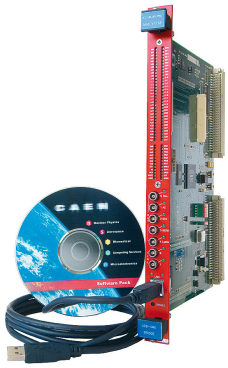
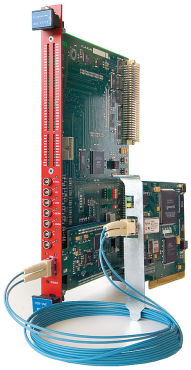
Every CAEN digitizer can be controlled directly via Optical Link; for this purpose a CAEN PCI or PCIe controller (Mod. A2818 and A3818) is required. See the web pages of A2818/A3818 for more info.

In this case the unit must be connected to the featured controller via the optical fibre cable (see the Ordering Options of the controller).

Link through a VME Bridge

VME Digitizer Boards can be controlled via VMEbus through a VME Bridge.

Two CAEN bridges are available:

V1718 / VX1718 with USB interface (requiring just a host PC with a free USB port)	**V2718 / VX2718** with Optical Link (requiring Mod. A3818 or A2818 controller)
	

Tab. 2.1: CAEN Bridges

3 Getting Started

This Section will help you to understand the *CAENScope* functionality step by step: from the start-up to the first acquisition.

For this example we feed the Channel 0 of the digitizer with a NIM signal (unipolar square signal with Amplitude -800 mV) of 1kHz of Frequency and Width 10µs. The digitizer used is a **V1720**. If you can use the same signal follow this guide, otherwise try to fit these tips to your set-up.

Fig. 3.1: CAEN V1720 digitizer

CAENScope GUI Overview

Follow the path `Start > Programs > CAEN > Digitizers > CAENScope`

Click the CAENScope Icon; after you clicked the **Connect** button, the GUI will look like this:

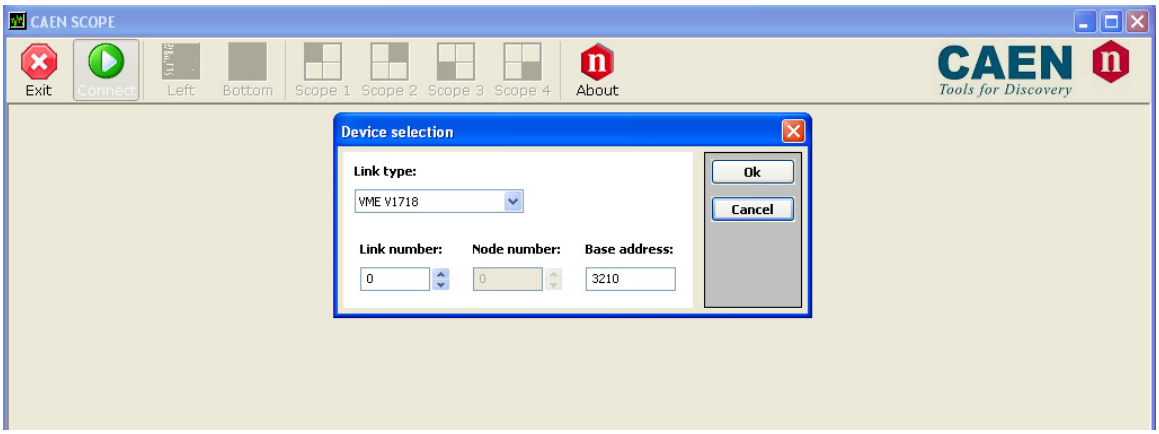


Fig. 3.2: Device selection window in CAENScope

Select your connection setting according to your setup; in our example, we select Link type: `V1718` (CAEN VME bridge with USB link), Link Number: `0` (we have only one bridge connected to our PC) and the digitizer's Base Address: `3210` (you have to check the Base Address selected on your board).

After you connected the digitizer, the GUI should appear like Fig. 3.3

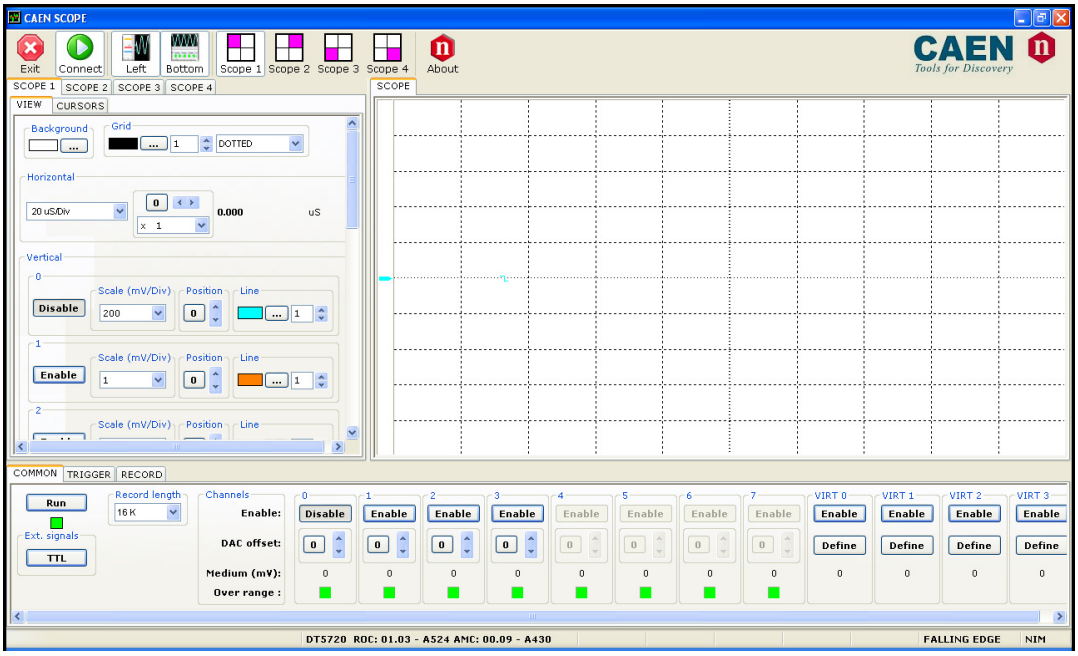


Fig. 3.3: CAENScope GUI after successful connection with the digitizer

The graphical interface is divided in four sections:

On the Top: **Show/Hide Panels Controls**.

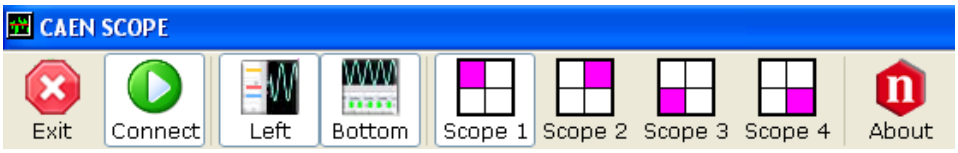


Fig. 3.4: View of the Top Section

On the Left: **Channels visualization options** (colours, graphical offset, horizontal and vertical scales, cursors).

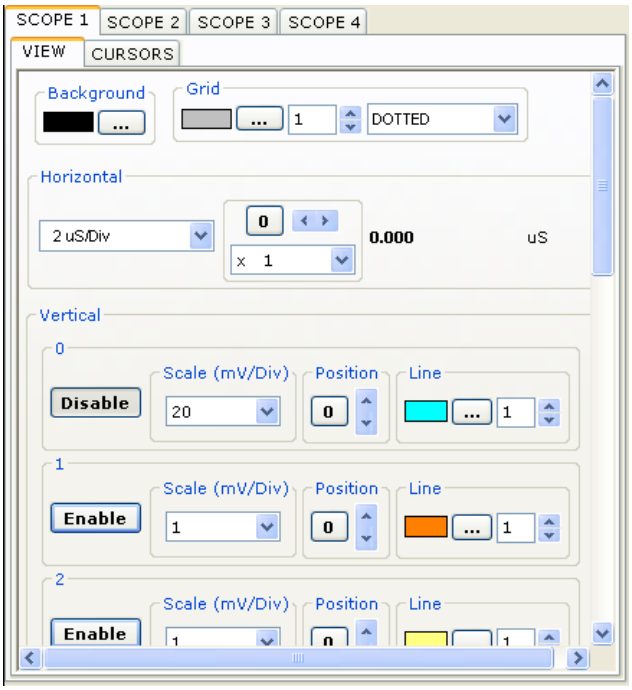


Fig. 3.5: View of the Left Section

On the Right: **Scope**. Up to 4 Scopes can be displayed simultaneously.

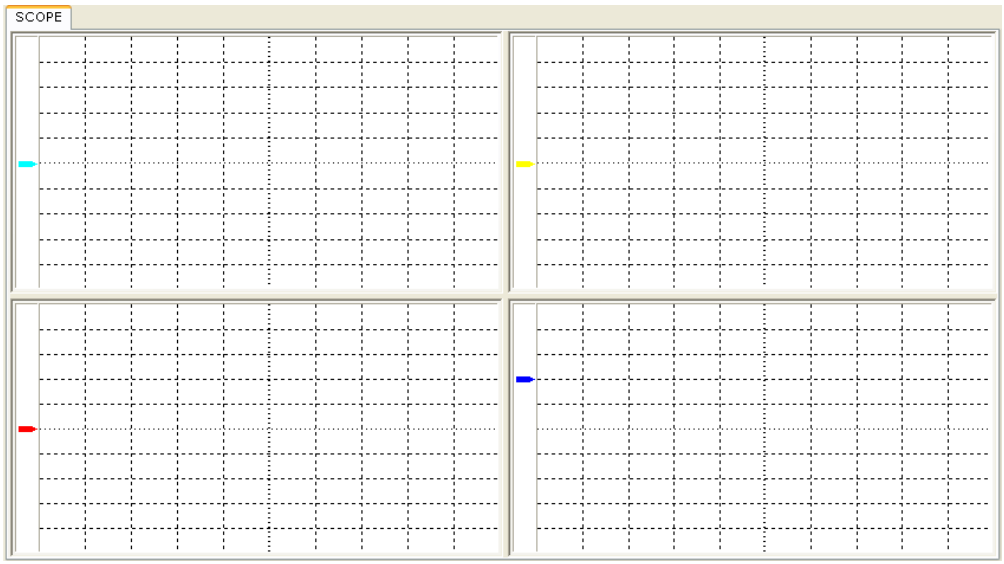


Fig. 3.6: View of the Right Section

On the Bottom: **Channel**, **Trigger** and **Record** Settings.

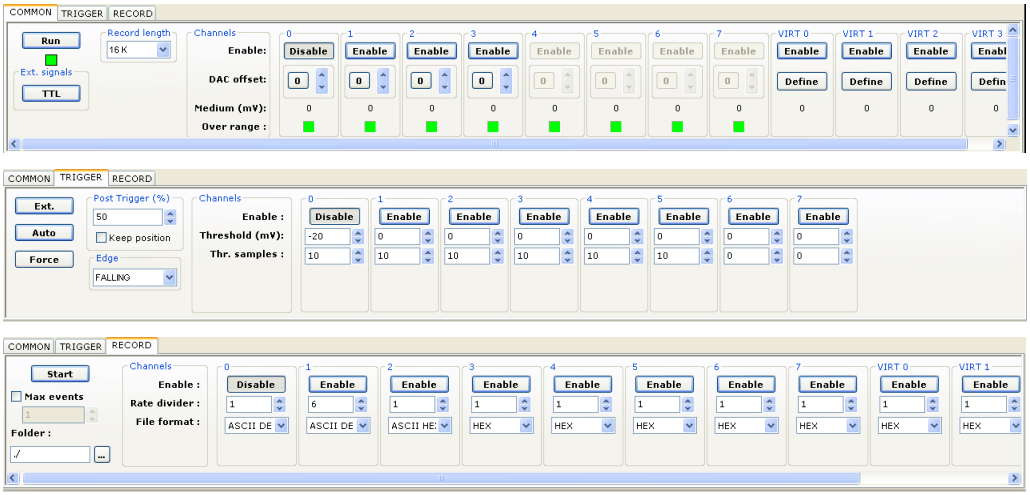


Fig. 3.7: View of the Bottom Section

Scope your Signal

Connect your pulse generator to Channel 0 of your digitizer.

In the Common Tab of the Bottom Section, verify that Channel 0 is enabled.

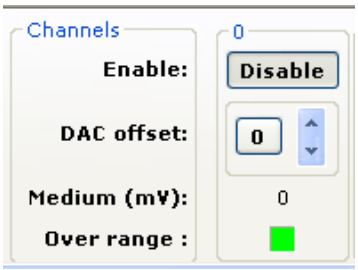


Fig. 3.8: Channel 0 controls

Click the **Run** button in the same Section: this will start the data acquisition, verify that the *RUN* and *TRG* LEDs on the board are on. At this point the channel 0 trace should appear on the Scope Tab, but it must be optimized.

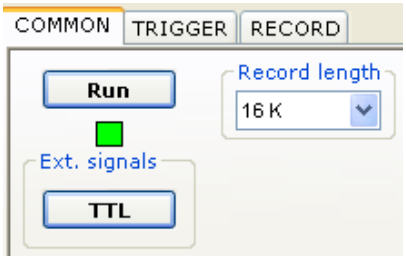


Fig. 3.9: Run button in the COMMON Tab

First of all: adjust the Channel 0 Vertical Scale, acting on the dedicated **Set channel view scale** box in the Channel 0 parameters in the `VIEW` Tab.

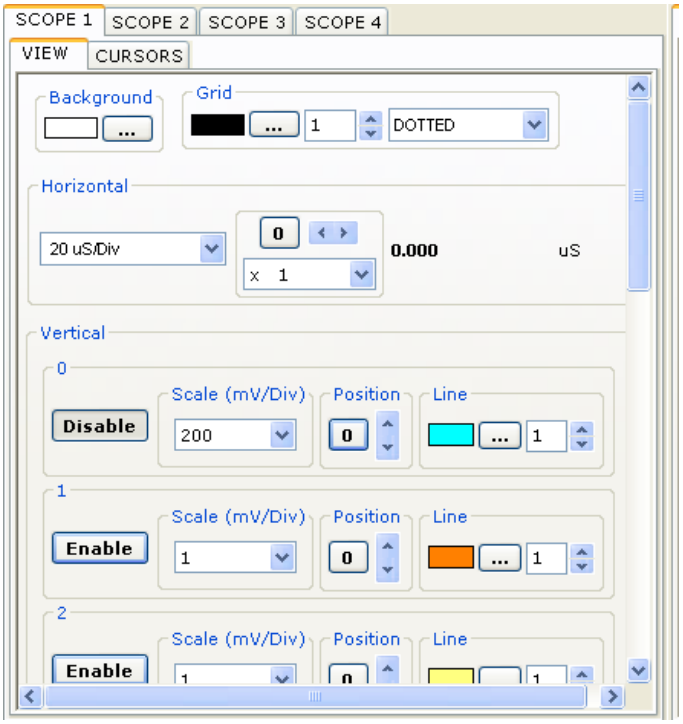


Fig. 3.10: VIEW Tab in the Left Section

A value of 200mV/Div should be correct for signals with this amplitude.

Modify the **Horizontal** scale, acting on the dedicated control box in the View Tab in the Left Panel. Selecting the right value (with our signal it's 20 µs), you should see the trace on your scope, but you it needs more adjustments.

Now you should see a signal moving on your scope, this is because there's the default Auto Trigger that is asynchronous with respect to the input signal.

The next step is to modify the trigger options to visualize a stable signal.

Go in the Trigger Tab in the Bottom section, enable the **Channel Trigger** and insert a suitable value for the **Trigger Threshold**. Select **Rising** or **Falling Edge** in the relevant box according to your signal and disable the **Auto** triggering.

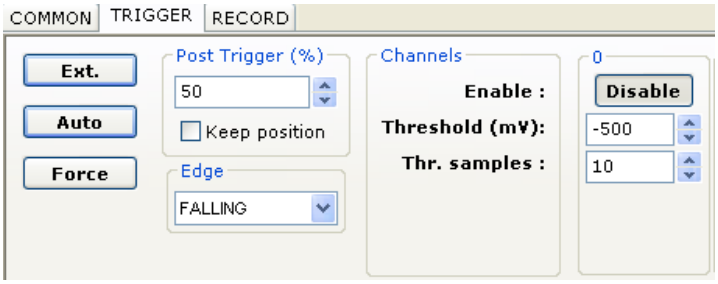


Fig. 3.11: TRIGGER Tab in the Bottom Section

With this set-up you should choose Falling Edge and -500 mV Trigger Threshold.

Now you can center your signal in the middle of the scope acting on the **Post Trigger** value in the `TRIGGER` Tab: Increasing this value will move the signal to the left.

A stable and centred signal should be on your scope.

You could notice not a perfect stabilization of the pulse within the scope (compared to an oscilloscope), but this is an expected behaviour, due the fact that the input signal is asynchronous with respect to the clock that drives the Trigger Logic on the digitizer.

Just to practice: try to change the horizontal and vertical scale until you are satisfied with the visualization.

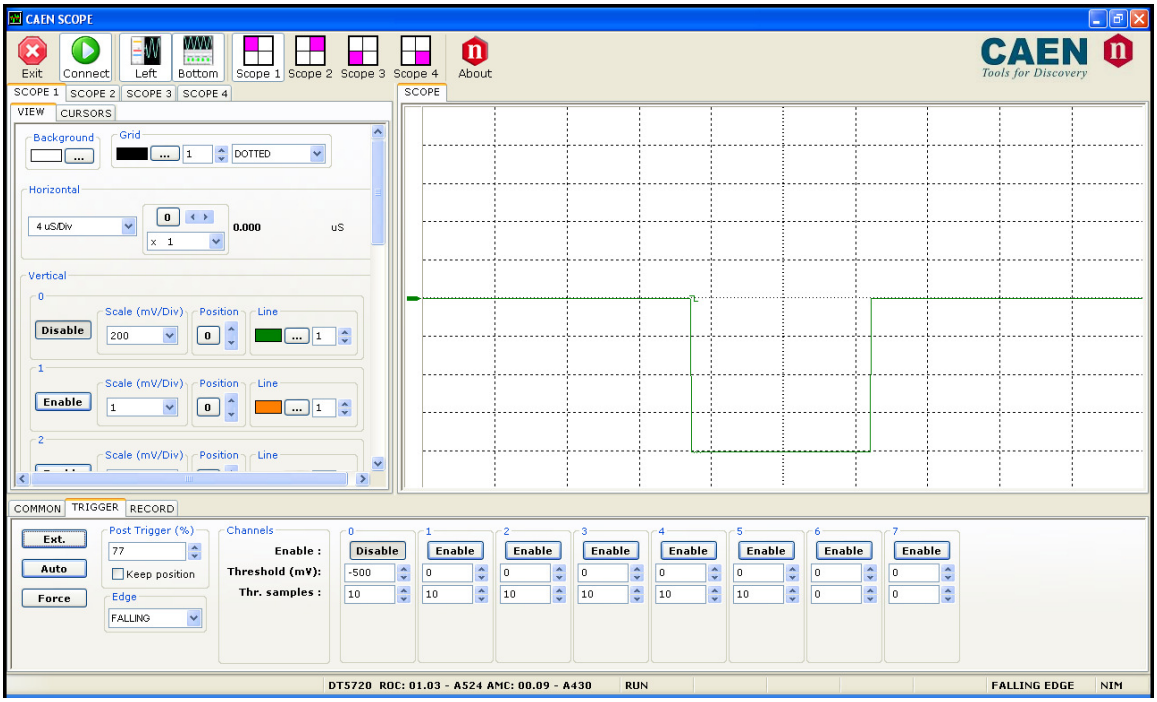


Fig. 3.12: Visualization of the acquired pulses in CAENScope

Other commands and features

In this section we will briefly discuss some command not shown in the previous one and some extended features of *CAENScope*.

DAC Offset: This command allows to add a DC Offset to the input signal in order to fit the digitizer dynamic range. As an example: hold pressed the down arrow of Channel 0 **DAC offset** and move down the trace until the Over range status becomes red. This means that your signal is “clipped” i.e. the signal is exceeding the dynamic input range of the digitizer.

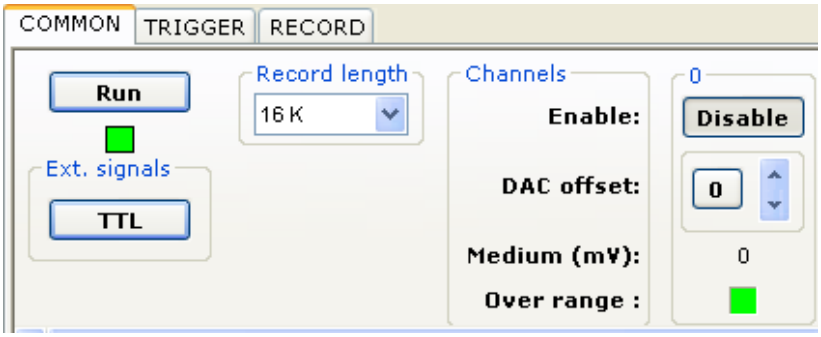


Fig. 3.13: DAC offset command in the COMMON Tab

Record Length: this value is the size of the digitizer memory buffers expressed in number of samples. This means that for each trigger the digitizer stores a number of sample equal to the Record Length. *CAENScope* reads and plots the samples of every memory buffer, so in a scope window you see exactly the number of samples set in the Record Length menu. This fact affects the choice of the Horizontal Scale according to the Sampling frequency of the digitizer.

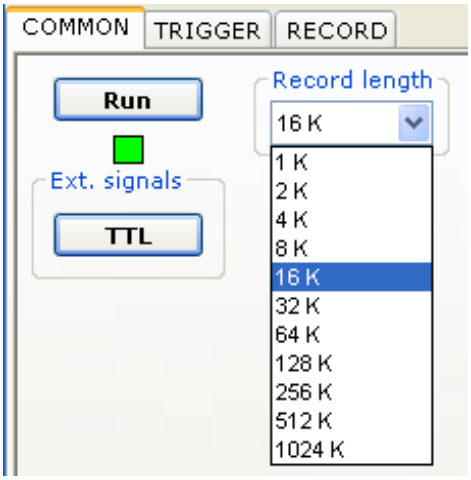


Fig. 3.14: Record length selection in the COMMON Tab

The product of Sampling Period and Record Length gives in fact the time value of the acquisition window. Select a horizontal time scale in order to visualize the entire acquisition window. In our case with a sampling period of 4ns and a Record Length of 32k, we obtain an acquisition window of 128 µs.

Virtual Probes: these are virtual channels that allow algebraic operations on the signals. The result signal can be monitored as an independent trace enabling the relative virtual channel.

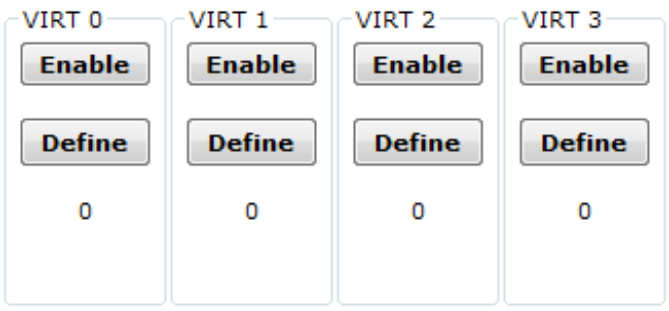


Fig. 3.15: Virtual Probes controls in the COMMON Tab

Save a waveform to file

In this section we will see how to acquire and save to file the input signal.

Once you are satisfied of your settings go to the Record Tab in the Bottom Panel.

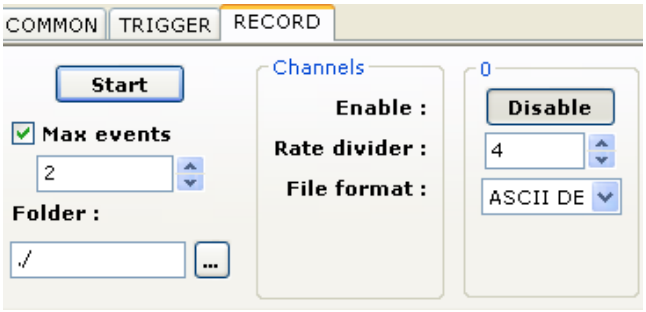


Fig. 3.16: RECORD Tab in the Bottom Section

Select the Maximum Number of Buffer, i.e. acquisition windows, you want to store. As an example and in order not to overload the PC, select a small number.

Enable Channel 0 Record.

Select the preferred Rate Divider. *CAENScope* saves one sample every N acquired, where N is the setting of the Rate Divider.

Select the preferred Data Format and the destination Folder.

Start the recording with the `START` button.

The data are stored on a file and ready for further analysis.

CAEN SpA is acknowledged as the only company in the world providing a complete range of High/Low Voltage Power Supply systems and Front-End/Data Acquisition modules which meet IEEE Standards for Nuclear and Particle Physics. Extensive Research and Development capabilities have allowed CAEN SpA to play an important, long term role in this field. Our activities have always been at the forefront of technology, thanks to years of intensive collaborations with the most important Research Centres of the world. Our products appeal to a wide range of customers including engineers, scientists and technical professionals who all trust them to help achieve their goals faster and more effectively.

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